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PLANETARY PHENOMENA FOR JULY AND AUGUST, 1914.

By Malcolm McNeill.

PHASES OF THE MOON, PACIFIC TIME.

Full Moon	July 7,	6^h 0^m A.M.	Full Moon	Aug. 5,	4^h 41^m P.M.
Last Quarter..	“ 14,	11 32 P.M.	Last Quarter ..	“ 13,	4 56 P.M.
New Moon. ..	“ 22,	6 38 P.M.	New Moon ...	“ 21,	4 26 A.M.
First Quarter...	“ 29,	3 51 P.M.	First Quarter .	“ 27,	8 52 P.M.

The third eclipse of the year will be a total eclipse of the Sun, occurring August 21st. The regions traversed by the line of totality extend from the Arctic Ocean north of British North America, nearly eastward thru northern Greenland, Norway, Sweden, thence southeast thru the Baltic, Russia, the Black Sea, and Persia, ending in the northwestern part of India. The maximum duration of totality will be in Russia, where it will last not quite two and one-quarter minutes, rather a small duration, but the path is accessible. The eclipse may be seen as partial in the eastern part of the United States and Canada during the early morning.

The Earth reaches aphelion, its farthest distance from the Sun on July 2d, 4 P. M. Pacific time.

Mercury is an evening star on July 1st, setting a little more than an hour after sunset, and may be seen in the evening twilight under good weather conditions, but its distance from the Sun is growing smaller and it passes inferior conjunction on July 16th. It is then a morning star until it reaches superior conjunction on August 30th. Its maximum distance from the Sun is reached on August 5th, rather a small greatest elongation, 19° 14′, as the time is only eleven days before perihelion passage. During the first half of August the planet will rise about an hour and a quarter before the Sun, and will therefore not be a difficult object to see when the western sky is clear during evening twilight.

Venus is the most prominent object except the Moon in the western sky during the evenings of July and August. On July 1st it remains above the horizon a little more than two hours after sunset, and the interval shortens to about an hour and three quarters by the end of August. This shortening up of the interval between the setting of the Sun and of the planet is not due to a lessening of the apparent distance between the objects; in fact, the distance increases by about 5° during the two months, but because the planet's apparent position is increasingly south of that of the Sun. On July 1st *Venus* is 5° south of the Sun and on August 31st it is 19° south. On July 13th it passes about 1° south of *Regulus*, α *Leonis*, and on August 31st less than 1° north of *Spica*, α *Virginis*. On August 5th, 6 P. M. Pacific time, it is in very close conjunction with *Mars*, being only 10′ south. *Venus* is now much brighter than it was in the early spring, but will not reach its maximum until toward the end of October.

Mars is still an evening star, but its apparent distance from the Sun is continually diminishing. On July 1st it sets at about half-after ten and on August 31st at a little before 8 P. M. It moves 35° eastward and 16° southward from *Leo* into *Virgo*. On August 8th it makes a very close approach to the fourth-magnitude star β *Virginis*, and on August 30th it passes very close to the third-magnitude star γ *Virginis*. Its conjunction with *Venus* on August 5th has been previously mentioned. It is still growing fainter, altho at a less rapid rate than during the early part of the year, and its brightness at the end of August is only about one fourteenth as great as it was at the time of opposition in January. Its distance from the Earth increases from 187,000,000 to 217,000,000 miles during the two months.

Jupiter rises before 10 P. M. on July 1st and an hour before sunset at the end of August. It comes to opposition on August 10th and is then above the horizon thruout the entire night. It is in the constellation *Capricorn* and moves 7° westward and 2° southward during the two months. The Moon passes very close to the planet on the south on the night of July 9th-10th and again on the night of August 5th-6th. For some points in the southern hemisphere the planet will be occulted on both occasions.

Saturn passed conjunction with the Sun on June 13th and is now a morning star. On July 1st it rises a little less than an hour before sunrise, and on August 31st shortly after midnight. It is in the eartern part of *Taurus* and moves about 7° eastward nearly to the border of *Gemini* during the two months. As seen in the telescope, the rings present about the same appearance as they did earlier in the year, the apparent minor axis being about 44 per cent of the major.

Uranus rises at about half-after nine on July 1st, and on August 2d comes to opposition with the Sun, rising at sunset. At the end of August it will be above the horizon until about 3 A. M. It is in the constellation *Capricorn,* about 11° west and 3° south of *Jupiter,* and at the end of August the distance has diminished to about 6° west and 2° south. This is on account of the greater westward motion of *Jupiter, Uranus* moving about 2° westward in the period. No bright star is near.

Neptune is in conjunction with the Sun on July 21st, changing from an evening to a morning star, but is too near the Sun for observation even with a telescope.

PLANETARY PHENOMENA FOR SEPTEMBER AND OCTOBER, 1914.

By Malcolm McNeill.

PHASES OF THE MOON, PACIFIC TIME.

Full Moon	Sept. 4,	$6^{h}\ 1^{m}$ A.M.	Full Moon	Oct. 3,	$9^{h}\ 59^{m}$ P.M.
Last Quarter	" 12,	9 48 A.M.	Last Quarter	" 12,	1 33 A.M.
New Moon	" 19,	1 33 P.M.	New Moon	" 18,	10 33 P.M.
First Quarter	" 26,	4 3 A.M.	First Quarter	" 25,	2 44 P.M.

The fourth and last eclipse of the year, a partial eclipse of the Moon, will occur on the morning of September 4th. No part of it will be visible from the eastern part of the United States, but a part may be seen in the far west. The circumstances of the eclipse are as follows, Pacific time:—

Moon enters penumbra	September 4,	$3^{h}\ 1^{m}$ A.M.
Moon enters shadow	" 4,	4 16 A.M.
Middle of eclipse	" 4,	5 55 A.M.
Moon leaves shadow	" 4,	7 33 A.M.
Moon leaves penumbra	" 4,	8 48 A.M.